Solution by G. B. M. ZERR, A. M., Ph. D., Professor of Chemistry and Physics, The Temple College, Philadelphia, Pa.

Let $\operatorname{sn} u = x$. $\therefore x^4 + 2x^2 + 1/\kappa^2 = 0$, where κ is the modulus.

$\therefore (x^2+1)^2 = -(1-\kappa^2)/\kappa^2$.

$$\therefore x = \pm\sqrt{\frac{-\kappa \pm \sqrt{(-1)}\sqrt{(1-\kappa^2)}}{\kappa}} = \pm n, \text{ suppose.} \quad \therefore \operatorname{sn} u = \pm n.$$

$$\therefore u = 2\int_0^n \frac{dx}{\sqrt{[(1-x^2)(1-\kappa^2x^2)]}} = 2F(\kappa, n)$$

$$= 2[n + \tfrac{1}{6}n^3(1+\kappa^2) + \tfrac{1}{40}n^5(3+2\kappa^2+3\kappa^4) + \ldots\ldots].$$

When $\kappa = 1$, $u = 2\sqrt{-1}(1 - \frac{1}{3} + \frac{1}{5} - \frac{1}{7} + \ldots\ldots)$, since $n = \pm\sqrt{-1}$).

$\therefore u = \frac{1}{2}\pi\sqrt{-1}$.

But $u = 2\int_0^{\sqrt{-1}} \frac{dx}{1-x^2} = \log\left(\frac{1+\sqrt{-1}}{1-\sqrt{-1}}\right)$.

$\therefore \pi = 2\sqrt{-1}\log\left(\frac{1-\sqrt{-1}}{1+\sqrt{-1}}\right)$, a result previously referred to in this journal.

PROBLEMS FOR SOLUTION.

ARITHMETIC.

167. Proposed by F. P. MATZ, Sc. D., Ph. D., Professor of Mathematics and Astronomy in Defiance College, Defiance, Ohio.

A traveler notices that $m = 2\frac{1}{2}$ times the number of spaces between the telegraph poles that he passes in a minute is the rate of train in miles per hour. How far apart are the poles?

168. Proposed by F. P. MATZ, Sc. D., Ph. D., Professor of Mathematics and Astronomy in Defiance College, Defiance, Ohio.

If I buy for $m = 10\%$ and $n = 5\%$ *less* I shall gain $p = 15\%$ and $q = 5\%$ *more*. What is my rate of gain?

ALGEBRA.

178. Proposed by W. J. GREENSTREET, M. A., Editor of The Mathematical Gazette, Stroud, England.

A_n being the arithmetic mean of the nth powers of the numbers less than p and prime to it, find a relation between A_3, A_2 and p.

179. Proposed by DR. L. E. DICKSON, The University of Chicago.

Find the roots of the algebraically solvable quintic equation

$$x^5 + qx^2 + px + \tfrac{1}{5}\left(\frac{q^2}{p} - \frac{p^3}{5q}\right) = 0.$$